Dell OptiPlex 990 Desktop Service Manual

Regulatory Model: D05D
Regulatory Type: D05D001

Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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1

Working on Your Computer

Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or--if purchased separately--installed by performing the removal procedure in reverse order.

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as a connector on the back of the computer.

CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

NOTE: The color of your computer and certain components may appear differently than shown in this document.

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer (see Turning Off Your Computer).

CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

3. Disconnect all network cables from the computer.
4. Disconnect your computer and all attached devices from their electrical outlets.
5. Press and hold the power button while the computer is unplugged to ground the system board.
6. Remove the cover.

CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity, which could harm internal components.

Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Small plastic scribe
- Flash BIOS update program media

Turning Off Your Computer

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.

1. Shut down the operating system:
   - In Windows 7:

     Click **Start**, then click **Shut Down.**
   - In Windows Vista:

Click **Start**, then click the arrow in the lower-right corner of the **Start** menu as shown below, and then click **Shut Down**.

– In Windows XP:

Click **Start** → **Turn Off Computer** → **Turn Off** . The computer turns off after the operating system shutdown process is complete.

2. Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

After Working Inside Your Computer

After you complete any replacement procedure, ensure you connect any external devices, cards, and cables before turning on your computer.

1. Replace the cover.

CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.

2. Connect any telephone or network cables to your computer.
3. Connect your computer and all attached devices to their electrical outlets.
4. Turn on your computer.
5. Verify that the computer works correctly by running the Dell Diagnostics.

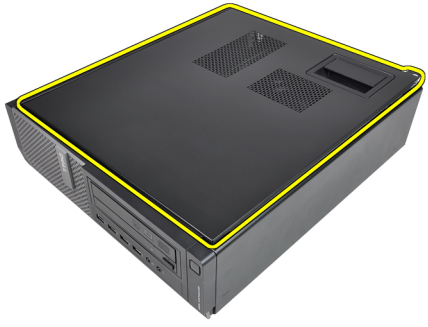
2

Cover

Removing the Cover

1. Follow the procedures in Before Working Inside Your Computer.
2. Pull up the cover-release latch at the side of the computer.

3. Lift the cover upward to a 45–degree angle and remove it from the computer.



Installing The Cover

1. Place the computer cover on the chassis.
2. Press down on the computer cover until it clicks into place.

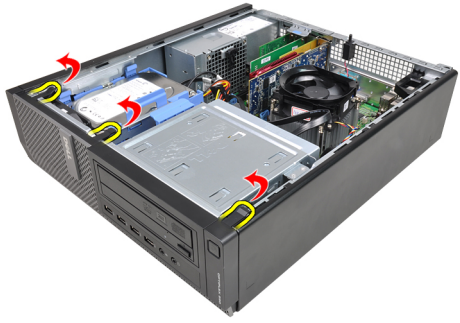
3. Follow the procedures in After Working Inside Your Computer.

3

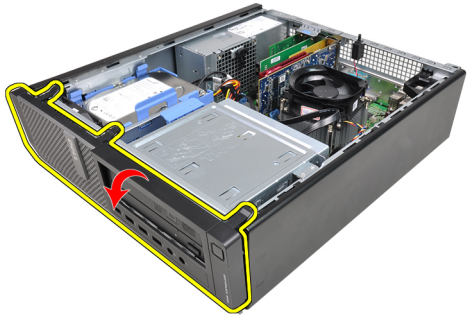
Front Bezel

Removing the Front Bezel

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Pry the front bezel retention clips away from the chassis.



4. Rotate the bezel away from the computer to release the hooks on the opposite edge of the bezel from the chassis.



Installing The Front Bezel

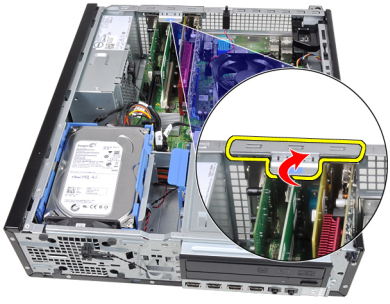
1. Insert the hooks along the bottom edge of the front bezel into the slots on the chassis front.
2. Rotate the bezel towards the computer to engage the four front-bezel retention clips until they click into place.
3. Install the cover.
4. Follow the procedures in After Working Inside Your Computer.

4

Cards

Removing the Expansion Card

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Rotate the release tab on the card-retention latch upward.



4. Pull the release lever away from the PCIe x16 card to release the securing tab from the dent in the card. Then, ease the card up and out of its connector and remove it from the computer.

5. Lift the PCIe x1 expansion card (if any) up and out of its connector and remove it from the computer.

6. Lift the PCI expansion card (if any) up and out of its connector and remove it from the computer.

7. Lift the PCI x4 expansion card (if any) up and out of its connector and remove it from the computer.

Installing The Expansion Card

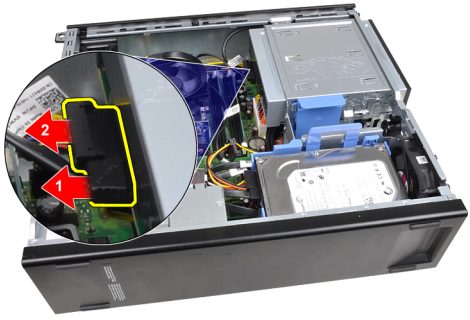
1. Insert the PCIe x4 card into the connector on the system board and press down to secure it in place.
2. Insert the PCIe card (if any) into the connector on the system board and press down to secure it in place.
3. Insert the PCIe x1 card (if any) into the connector on the system board and press down to secure it in place.
4. Insert the PCIe x16 card (if any) into the connector on the system board and press down to secure it in place.
5. Install the cover.
6. Follow the procedures in After Working Inside Your Computer.

5

Optical Drive

Removing the Optical Drive

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the front bezel.
4. Remove the data cable and power cable from the back of the optical drive.



5. Slide up the optical-drive latch and then push the optical drive from the back towards the front of the computer.

Installing The Optical Drive

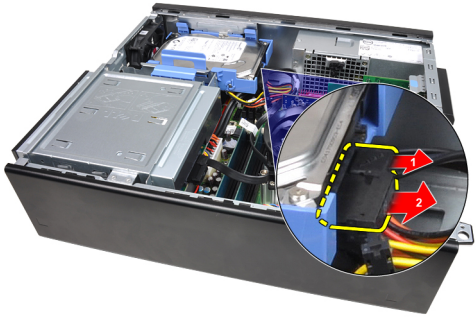
1. Slide down the optical-drive latch and push the optical drive from the front towards the back of the computer.
2. Connect the data cable and power cable to the optical drive.
3. Install the front bezel.
4. Install the cover.
5. Follow the procedures in After Working Inside Your Computer.

6

Hard Drive

Removing the Hard Drive

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the data cable and power cable from the back of the hard drive.

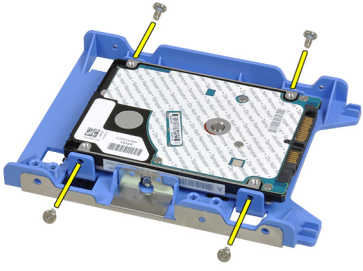


4. Press the hard-drive bracket latch towards the hard drive and lift it upward.

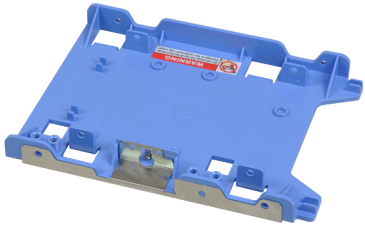
5. Flex the hard-drive bracket and then remove the single 3.5 inch hard drive or two 2.5 inch hard drives from the bracket.

6. Turn over the hard-drive bracket and release the screws that secure the 2.5 inch hard drive to the underside of the bracket.

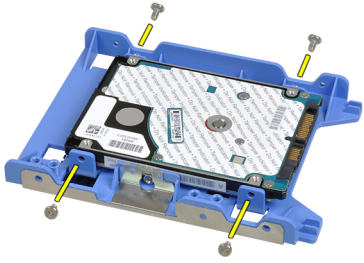
7. Flex the hard-drive bracket and then remove the two 2.5 inch hard drives from the bracket.



8. Release the screws that secure the 2.5 inch hard drive to the top of the hard-drive bracket.



9. Release the screws that secure the 2.5 inch hard drive to the underside of the hard drive bracket.



Installing The Hard Drive

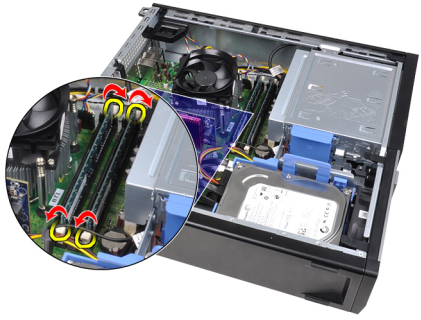
1. Tighten the screws to secure the 2.5 inch hard drive(s) to the hard-drive bracket.
2. Flex the hard-drive bracket and then insert the single 3.5 inch hard drive or the two 2.5 inch hard drives into the bracket.
3. Press the hard-drive bracket latch towards the hard drive and insert it into the chassis.
4. Connect the data cable and power cable to the back of the hard drive(s).
5. Install the cover.
6. Follow the procedures in After Working Inside Your Computer.

7

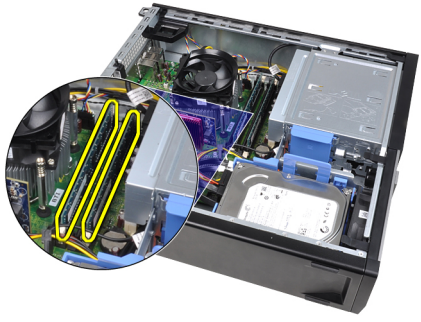
Memory

Removing the Memory

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Release the memory-retention clips on each side of the memory modules.



4. Lift the memory modules out of the connectors on the system board.



Installing The Memory

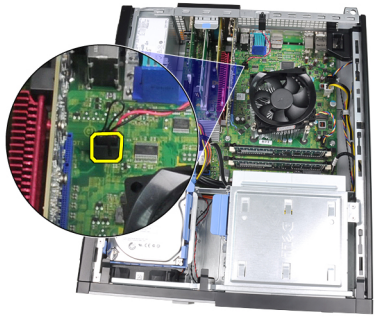
1. Insert the memory modules into the connectors on the system board. Install the memory module in the order of A1 > B1 > A2 > B2.
2. Press down on the memory modules until the retention clips spring back to secure them in place.
3. Install the cover.
4. Follow the procedures in After Working Inside Your Computer.

8

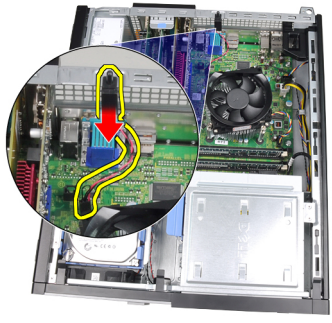
Chassis Intrusion Switch

Removing the Chassis Intrusion Switch

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Disconnect the intrusion-switch cable from the system board.



4. Slide the intrusion switch toward the chassis bottom and remove it from the system board.



Installing The Chassis Intrusion Switch

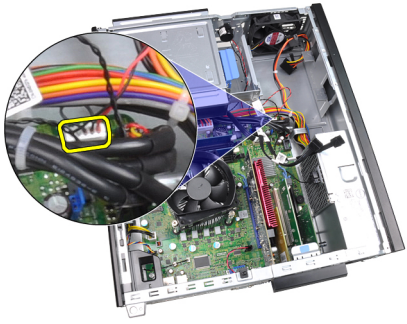
1. Insert the intrusion switch into the chassis rear and slide it toward the chassis top to secure it.
2. Connect the intrusion-switch cable to the system board.
3. Install the cover.
4. Follow the procedures in After Working Inside Your Computer.

9

Speaker

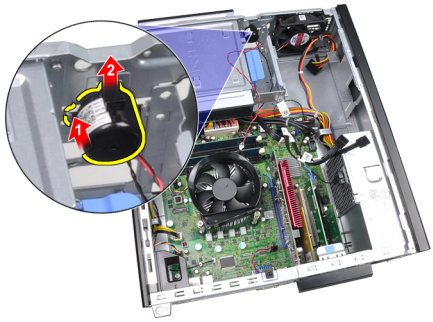
Removing The Speaker

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Disconnect the speaker cable from the system board.



4. Unthread the speaker cable from the chassis clip.

5. Press down the speaker-securing tab and slide the speaker upwards to remove it.



Installing The Speaker

1. Press the speaker-securing tab and slide the speaker downward to secure it.
2. Thread the speaker cable into the chassis clip.
3. Connect the speaker cable to the system board.
4. Install the cover.
5. Follow the procedures in After Working Inside Your Computer.

10

Heat Sink

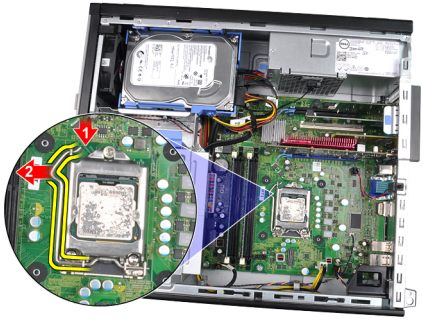
Removing The Heat Sink and Processor

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Disconnect the heat-sink assembly cable from the system board.

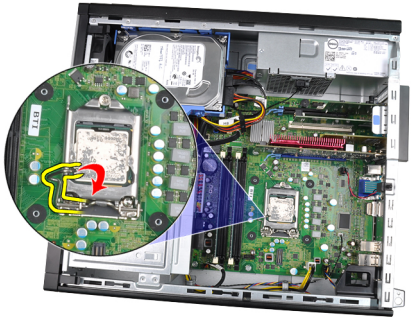
4. Loosen the captive screws in the order: 1, 2, 3 and 4.

5. Lift the heat sink assembly upwards, and remove it from the computer. Lay the assembly with the fan facing downwards, and with the thermal grease facing upwards.

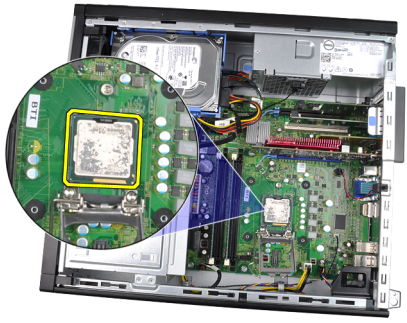
6. Press the release lever down and then move it outward to release it from the retention hook that secures it.



7. Lift the processor cover.



8. Lift the processor to remove it from the socket and place it in an antistatic package.



Installing The Heat Sink and Processor

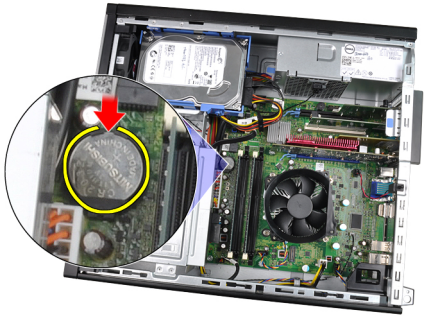
1. Insert the processor into the processor socket. Ensure that the processor is properly seated.
2. Lower the processor cover.
3. Press the release lever down and then move it inward to secure it with the retention hook.
4. Place the heat sink assembly into the chassis.
5. Tighten the captive screws to secure the heat sink assembly to the system board.
6. Connect the heat sink assembly cable to the system board.
7. Install the cover.
8. Follow the procedures in After Working Inside Your Computer.

11

Coin-Cell Battery

Removing The Coin-Cell Battery

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Press the coin-cell battery inward to allow the battery to pop up from the socket.



4. Lift the coin-cell battery out of the computer.

Installing The Coin-Cell Battery

1. Place the coin-cell battery into its slot on the system board.
2. Press the coin-cell battery downwards until it is secured.
3. Install the cover.
4. Follow the procedures in After Working Inside Your Computer.

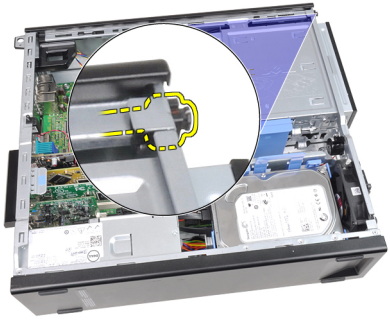
12

Power-Switch Cable

Removing The Power-Switch Cable

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the front bezel.
4. Disconnect the power-switch cable from the system board.

5. Pry the power-switch cable free.



6. Slide the power-switch cable out through the front of the computer.

Installing The Power-Switch Cable

1. Slide the power-switch cable in through the front of the computer.
2. Secure the power-switch cable to the chassis.
3. Connect the power-switch cable to the system board.
4. Install the front bezel.
5. Install the cover.
6. Follow the procedures in After Working Inside Your Computer.

13

Front Thermal Sensor

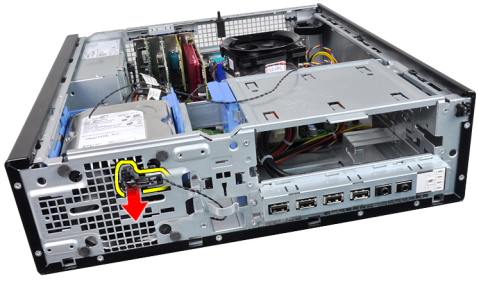
Removing The Front Thermal Sensor

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the front bezel.
4. Disconnect the thermal-sensor cable from the system board.

5. Unthread the thermal-sensor cable from the chassis clips.

6. Unthread the thermal-sensor cable from the chassis clip.

7. Pry the thermal sensor away from the chassis front and remove.



Installing The Front Thermal Sensor

1. Secure the thermal sensor to the chassis front.
2. Thread the thermal-sensor cable into the chassis clips.
3. Connect the thermal-sensor cable to the system board.
4. Install the front bezel.
5. Install the cover.
6. Follow the procedures in After Working Inside Your Computer.

14

Chassis Fan

Removing The System Fan

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the front bezel.
4. Disconnect the system-fan cable from the system board.

5. Unthread the system-fan cable from the chassis clips.

6. Slide the four grommets inward and through the slots in the front of the computer.

7. Lift and remove the system fan out of the computer.

8. Pry up and remove the four grommets from the system fan.

Installing The System Fan

1. Place the system fan in the chassis.
2. Pass the four grommets through the chassis and slide outwards along the grooves to secure them in place.
3. Thread the system-fan cable into the chassis clips.

4. Connect the system-fan cable to the system board.
5. Install the front bezel.
6. Install the cover.
7. Follow the procedures in After Working Inside Your Computer.

15

Input/Output Panel

Removing The Input/Output Panel

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the front bezel.
4. Disconnect the Input/Output panel or the FlyWire cable from the system board.

5. Remove the screw that secures the Input/Output panel to the chassis.

6. Slide the Input/Output panel towards the right of the system to release from chassis.

7. Remove the Input/Output panel.

Installing The Input/Output Panel

1. Insert the Input/Output panel into the slot on the chassis front.
2. Slide the Input/Output panel towards the left of the computer to secure to the chassis.
3. Tighten the screw to secure the Input/Output panel to the chassis.
4. Connect the Input/Output panel or the FlyWire cable to the system board.
5. Install the front bezel.
6. Install the cover.
7. Follow the procedures in After Working Inside Your Computer.

16

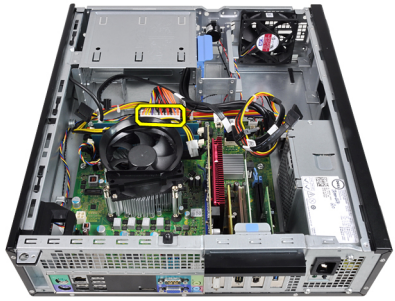
Power Supply

Removing The Power Supply

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the PSU thermal sensor.
4. Disconnect the 4–pin power cable from the system board.

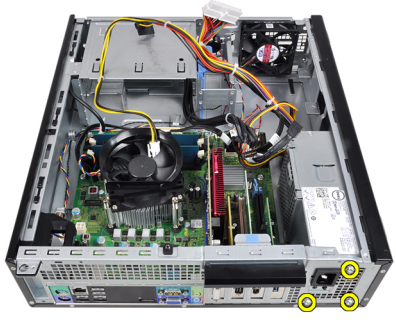
5. Unthread the 4–pin power cable from the chassis clips.

6. Disconnect the 24–pin power cable from the system board.

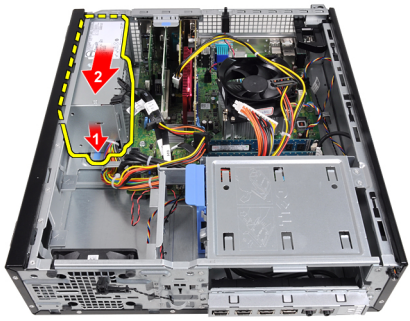


7. Unthread the 24–pin power cable from the chassis clip.

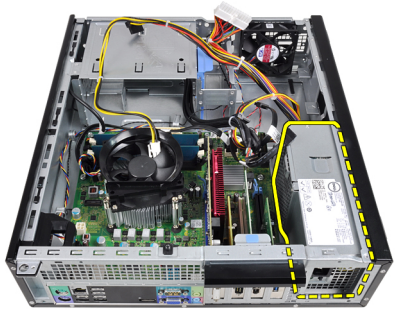
8. Remove the screws that secure the power supply to the back of the computer.



9. Push in on the blue release tab beside the power supply, and slide the power towards the front of the computer.



10. Lift the power supply out of the computer.



Installing The Power Supply

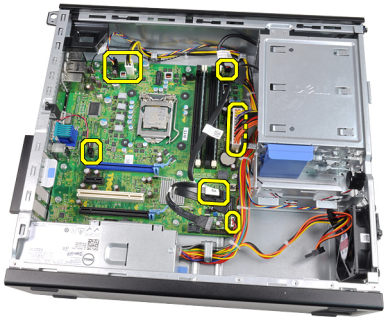
1. Place the power supply in the chassis and slide towards the back of the computer to secure it.
2. Tighten the screws to secure the power supply from the back of the computer.
3. Thread the 24–pin power cable into the chassis clip.
4. Connect the 24–pin power cable to the system board.
5. Thread the 4–pin power cable into the chassis clips.
6. Connect the 4–pin power cable to the system board.
7. Install the PSU thermal sensor.
8. Install the cover.
9. Follow the procedures in After Working Inside Your Computer.

17

System Board

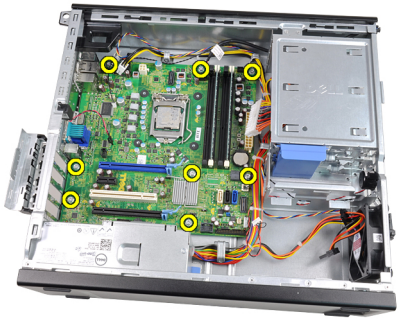
Removing The System Board

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Remove the front bezel.
4. Remove the hard drive.
5. Remove the expansion cards.
6. Remove the heat sink and processor.
7. Disconnect all the cables connected to the system board.

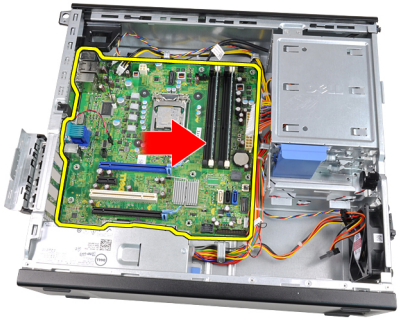


8. Lift and release the expansion-card latch to gain access to the screws securing the system board.

9. Remove the screws that secure the system board to the chassis.



10. Slide the system board towards the front of the computer.



11. Remove the system board from the chassis.

Installing The System Board

1. Align the system board to the port connectors on the back of the chassis and place the system board in the chassis.
2. Tighten the screws securing the system board to the chassis.

3. Close the expansion-card latch.
4. Connect the cables to the system board.
5. Install the heat sink and processor.
6. Install the expansion card.
7. Install the hard drive.
8. Install the front bezel.
9. Install the cover.
10. Follow the procedures in After Working Inside Your Computer.

18

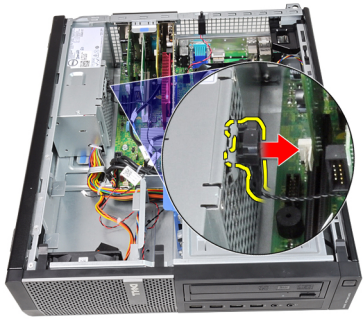
Power Supply Unit (PSU) Thermal Sensor

Removing The PSU Thermal Sensor

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the cover.
3. Disconnect the thermal-sensor cable from the system board.

4. Unthread the thermal-sensor cable from the chassis clip.

5. Pry the thermal sensor away from the power supply and remove from the chassis.



Installing The PSU Thermal Sensor

1. Secure the thermal sensor to the power supply.
2. Thread the thermal-sensor cable into the chassis clip.
3. Connect the thermal-sensor cable to the system board.
4. Install the cover.
5. Follow the procedures in After Working Inside Your Computer.

19

System Setup

System Setup

This computer offers you the following options:

- Access System Setup by pressing <F2>
- Bring up a one-time boot menu by pressing <F12>

Press <F2> to enter System Setup and make changes to the user-definable settings. If you have trouble entering System Setup using this key, press <F2> when the keyboard LEDs first flash.

Boot Menu

This feature gives users a quick and convenient mechanism to bypass the System Setup-defined boot device order and boot directly to a specific device (for example: floppy, CD-ROM, or hard drive).

Keystroke	Function
<Ctrl><Alt><F8>	one-time boot and diagnostics utility menu
<F12>	one-time boot and diagnostics utility menu

Boot Menu Enhancements

The boot menu enhancements are as follows:

- **Easier access** — Although the <Ctrl><Alt><F8> keystroke still exists and can be used to call up the menu, simply press <F12> during system boot to access the menu.
- **User prompting** — Not only is the menu easy to access, when you are prompted to use the keystroke on the BIOS splash screen (see image below). The keystroke is not "hidden".
- **Diagnostics options** — The boot menu includes two diagnostic options, **IDE Drive Diagnostics** (90/90 Hard Drive Diagnostics) and **Boot to the Utility Partition**. The

benefit here is that you do not have to remember the <Ctrl><Alt><D> and <Ctrl><Alt><F10> keystrokes (although they still work).

NOTE: The BIOS features an option to disable either or both of the keystroke prompts under the System Security / Post Hotkeys submenu.

When you enter the <F12> or <Ctrl><Alt><F8> keystroke correctly, the computer beeps. The key sequence invokes the **Boot Device Menu**.

Since the one-time boot menu only affects the current boot, it has the added benefit of not requiring the technician to restore the customer's boot order after completing troubleshooting.

Timing Key Sequences

The keyboard is not the first device initialized by Setup. As a result, if you press a keystroke too early, you lock out the keyboard. When this happens, a keyboard error message appears on the monitor, and you cannot restart the system with the <Ctrl><Alt><Del> keys.

To avoid this scenario, wait until the keyboard is initialized before pressing the keystroke. There are two ways to know that this has happened:

- The keyboard lights flash.
- The "F2=Setup" prompt appears in the top right-hand corner of the screen during boot.

The second method is good if the monitor is already warmed up. If it is not, the system often passes the window of opportunity before the video signal is visible. If this is the case, rely on the first method—the keyboard lights—to know the keyboard is initialized.

Beep Codes and Text Error Messages

The OptiPlex BIOS is capable of displaying error messages in plain English, along with beep codes. If the BIOS determine the previous boot was unsuccessful, it displays an error message similar to the following:

```
Previous attempts at booting the system have failed at
checkpoint ______. For help resolving this problem, please
note this checkpoint and contact Dell Technical Support.
```

Navigation

The computer setup can be navigated by either the keyboard or the mouse.
Use the following keystrokes to navigate the BIOS screens:

Action	Keystroke
Expand and collapse field	<Enter>, left- or right-arrow key, or +/–
Expand or collapse all fields	< >
Exit BIOS	<Esc> — Remain in Setup, Save/Exit, Discard/Exit
Change a setting	Left or right-arrow key
Select field to change	<Enter>
Cancel modification	<Esc>
Reset defaults	<Alt><F> or **Load Defaults** menu option

System Setup Options

NOTE: Depending on the computer and its installed devices, the items listed in this section may or may not appear.

General	
System Information	Displays the following information: • System Information: Displays **BIOS Version, Service Tag, Asset Tag, Ownership Date, Manufacture Date,** and the **Express Service Code**. • Memory Information: Displays **Memory Installed, Memory Available, Memory Speed, Memory Channels**

	Mode, Memory Technology, DIMM 1 Size, DIMM 2 Size, DIMM 3 Size, and **DIMM 4 Size**. • Processor Information: Displays **Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable,** and **64-Bit Technology.** • PCI Information: Displays **SLOT1, SLOT2, SLOT3, SLOT4** • Device Information: Displays **SATA-0, SATA-1, SATA-2, SATA-3,** and **LOM MAC Address.**
Boot Sequence	Allows you to specify the order in which the computer attempts to find an operating system. The options are: • Diskette drive • USB Storage Device • CD/DVD/CD-RW Drive • Onboard NIC • SATA • CD/DVD/CD-RW Drive
Boot List Option	• Legacy • UEFI
Date/Time	Allows you to set the date and time. Changes to the system date and time take effect immediately.

System Configuration

Integrated NIC	Allows you to enable or disable the integrated network card. You can set the integrated NIC to: • Disabled • Enabled (default) • Enabled w/PXE • Enabled w/ImageServer **NOTE:** Depending on the computer and its installed devices, the items listed in this section may or may not appear.

Serial Port	Allows you to define the serial port settings. You can set the serial port to: • Disabled • Auto • COM1 • COM2 • COM3 • COM4 **NOTE:** The operating system may allocate resources even though the setting is disabled.
SATA Operation	Allows you to configure the operating mode of the integrated hard drive controller. • AHCI = SATA is configured for AHCI mode • ATA = SATA is configured for ATA mode • RAID ON = SATA is configured to support RAID mode • Disabled = The SATA controller is hidden
Drives	Allows you to enable or disable the various on-board drives: • SATA-0 • SATA-1 • SATA-2 • SATA-3
Smart Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART (Self Monitoring Analysis and Reporting Technology) specification. This option is disabled by default.
USB Configuration	This field configures the integrated USB controller. If Boot Support is enabled, the system is allowed to boot any type of USB Mass Storage Devices (HDD, memory key, floppy). USB-aware OS always see USB Mass Storage devices irrespective of this setting, provided the port is enabled. If USB port is enabled, device attached to this port is enabled and available for OS.

	If USB port is disabled, the OS cannot see any device attached to this port. • Enable USB Controller • Disable USB Mass Storage Dev • Disable USB Controller **NOTE:** USB keyboard and mouse always work in the BIOS setup irrespective of these settings.
Miscellaneous Devices	Allows you to enable or disable various on-board devices. Enable PCI Slot — This option is enabled by default.

Video

Multi-Display	Allows you to enable or disable Multi-Display. It should be enabled for Windows 7 32/64-bit only. . Enable Multi-Display — This option is disabled by default.

NOTE: The Video setting will only be visible when a video card is installed in the system.

Security

Internal HDD-1 Password	Allows you to set, change, or delete the password on the system's internal hard disk drive (HDD). Successful changes to this password take effect immediately. By default, the drive will not have a password set • Enter the old password • Enter the new password • Confirm new password
Strong Password	This field enforces strong passwords. Enforce strong password - This option is disabled by default.
Password Configuration	These fields control the minimum and maximum number of characters allowed for Admin and System passwords. • Admin Password Min • Admin Password Max • System Password Min

- System Password Max

Password Bypass

Allows you to bypass the System (Boot) Password and the internal HDD password prompts during a system restart.

- Disabled — Always prompt for the system and internal HDD password when they are set. This option is disabled by default.
- Reboot Bypass — Bypass the password prompts on Restarts (warm boots).

NOTE: The system will always prompt for the system and internal HDD passwords when powered on from the off state (a cold boot). Also, the system will always prompt for passwords on any module bay HDDs that may be present.

Password Change

Allows you to determine whether changes to the System and Hard Disk passwords are permitted when an administrator password is set.

Allow Non-Admin Password Changes — This option is enabled by default.

Non-Admin Setup Changes

This option lets you determine whether changes to the setup option are permitted when an administrator password is set.

Allow Wireless Switch Changes — This option is disabled by default.

TPM Security

This option lets you control whether the Trusted Platform Module (TPM) in the system is enabled and visible to the operating system.

TPM Security — This option is disabled by default.

NOTE: Activation, deactivation, and clear options are not affected if you load the setup program's default values. Changes to this option take effect immediately.

Computrace

This field lets you Activate or Disable the BIOS module interface of the optional Computrace Service from Absolute Software.

- **Deactivate** — This option is disabled by default.
- Disable
- Activate

Security	
Chassis Intrusion	Allows you to enable or disable the chassis intrusion feature. You can set this option to: • **Clear Intrusion Warning** — Enabled by default if chassis intrusion is detected. • Disable • Enable • **On-Silent** — Enabled by default if chassis intrusion is detected.
CPU XD Support	Allows you to enable or disable he execute disable mode of the processor. This option is enabled by default.
OROM Keyboard Access	Allows you to determine whether you access the Option ROM Configuration screens via hotkeys during boot. Specifically, these settings are capable of preventing access to Intel RAID (CTRL+I) or Intel Management Engine BIOS Extension (CTRL +P/F12) • **Enable** — User may enter OROM configuration screens via the hotkey. • **One-Time Enable** — User may enter OROM configuration screens via the hotkeys on next boot only. After next boot, the setting will revert to disabled. • **Disable** — User may not enter OROM configuration screens via the hotkey. This option is set to **Enable** by default.
Admin Setup Lockout	Allows you to enable or disable the option to enter Setup when an Admin password is set. This option is not set by default.

Performance	
Multi Core Support	This field specifies whether the process will have one or all cores enabled. The performance of some applications will improve with the additional cores. This option is enabled by default.
Intel® SpeedStep™	Allows you to enable or disable the Intel SpeedStep mode of the processor. This option is enabled by default.
C States Control	Allows you to enable or disable the additional processor sleep states. This option is enabled by default.

Performance

Intel® TurboBoost™	Allows you to enable or disable Inel TurboBoost mode of the processor. • Disabled — Does not allow the TurboBoost driver to increase the performance state of the processor above the standard performance. • Enabled — Allows the Intel Turbo driver to increase the performance of the CPU or graphics processor. This option is enabled by default.
Hyper-Thread Control	Allows you to enable or disable the Hyper-Threading Technology. This option is enabled by default.

Power Management

AC Recovery	Determines how the system responds when AC power is re-applied after a power loss. You can set the AC Recovery to: • Power Off (default) • Power On • Last State
Auto On Time	Allows you to set the option to automatically turn on the computer. Time is kept in standard 12-hour format (hour:minutes:seconds). Change the startup time by typing the values in the time and AM/PM fields. **NOTE:** This feature does not work if you turn off your computer using the switch on a power strip or surge protector or if **Auto Power is set to disabled**.
Deep Sleep Control	Allows you to define the controls when Deep Sleep is enabled. • Disabled • Enabled in S5 only • Enabled in S4 and S5 This option is Disabled by default.
Fan Control Override	Controls the speed of the system fan. This option is disabled by default. **NOTE:** When enabled, the fan runs at full speed.

Power Management	
Wake on LAN	This option allows the computer to power up from the off state when triggered by a special LAN signal. Wake-up from the Standby state is unaffected by this setting and must be enabled in the operating system. This feature only works when the computer is connected to AC power supply. • **Disabled** — Does not allow the system to power on by special LAN signals when it receives a wake-up signal from the LAN or wireless LAN. • **LAN Only** — Allows the system to be powered on by special LAN signals. This option is Disabled by default.

POST Behavior	
Numlock LED	Allows you to enable or disable the Numlock feature when your computer starts. This option is enabled by default.
Keyboard Errors	Allows you to enable or disable the keyboard error reporting when the computer starts. This option is enabled by default.
POST Hotkeys	Allows you to specify the function keys to display on the screen when the computer starts. **Enable F12 — Boot menu** (enabled by default)
Fast Boot	This option can speed up the boot process by bypassing some compatibility steps: • Minimal — The system boots quickly, unless the BIOS has been updated, memory changed, or the previous POST did not complete. • Thorough — The system does not skip any steps in the boot process. • Auto — This allows the operating system to control this setting (this works only when the operating system supports Simple Boot Flag). This option is set to **Thorough** by default.

Virtualization Support	
Virtualization	This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities

Virtualization Support	
	provided by Intel® Virtualization Technology. **Enable Intel® Virtualization Technology** — This option is enabled by default.
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel® Virtualization technology for direct I/O. **Enable Intel® Virtualization Technology for Direct I/O** — This option is disabled by default.

Maintenance	
Service Tag	Displays the Service Tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
SERR Messages	Controls the SERR message mechanism. This option is not set by default. Some graphics cards require that the SERR message mechanism be disabled.

Image Server	
Lookup Method	Specifies how the ImageServer looks up the server address. • Static IP • DNS (enabled by default) **NOTE:** This field is only relevant when the "Integrated NIC" control in the "System Configuration" group is set to "Enabled with ImageServer".
ImageServer IP	Specifies the primary static IP address of the ImageServer with which the client software communicates. The default IP address is **255.255.255.255**. **NOTE:** This field is only relevant when the "Integrated NIC" control in the "System Configuration" group is set to "Enabled with ImageServer" and when "Lookup Method" is set to "Static IP".
ImageServer Port	Specifies the primary IP port of the ImageServer with which the client communicates. The default IP port is **06910**.

Image Server

	NOTE: This field is only relevant when the "Integrated NIC" control in the "System Configuration" group is set to "Enabled with ImageServer".
Client DHCP	Specifies how the client obtains the IP address. • Static IP • DNS (enabled by default) **NOTE:** This field is only relevant when the "Integrated NIC" control in the "System Configuration" group is set to "Enabled with ImageServer".
Client IP	Specifies the static IP address of the client. The default IP address is **255.255.255.255**. **NOTE:** This field is only relevant when the "Integrated NIC" control in the "System Configuration" group is set to "Enabled with ImageServer" and when "Client DHCP" is set to "Static IP".
Client Subnet Mask	Specifies the subnet mask of the client. The default setting is **255.255.255.255**. **NOTE:** This field is only relevant when the "Integrated NIC" control in the "System Configuration" group is set to "Enabled with ImageServer" and when "Client DHCP" is set to "Static IP".
Client Gateway	Specifies the gateway IP address for the client. The default setting is **255.255.255.255**. **NOTE:** This field is only relevant when the "Integrated NIC" control in the "System Configuration" group is set to "Enabled with ImageServer" and when "Client DHCP" is set to "Static IP".
License Status	Displays the current license status.

System Logs

BIOS Events	Allows you to clear the system event logs.

	• Clear Log
DellDiag Events	Displays the DellDiag event log.
Thermal Events	Displays the thermal event log and allows you to: • Clear Log
Power Events	Allows you to clear the power event logs. • Clear Log
BIOS Progress Events	Displays the BIOS Progress event log.

20

Troubleshooting

Diagnostic LEDs

NOTE: The diagnostic LEDs only serve as an indicator of the progress through the Power-on Self-Test (POST) process. These LEDs do not indicate the problem that caused the POST routine to stop.

The diagnostic LEDs are located on the front of the chassis next to the power button. These diagnostic LEDs are only active and visible during the POST process. Once the operating system starts to load, they turn off and are no longer visible.

The system now includes pre-POST and POST LEDs in an attempt to help identifying a possible problem with the system easier and more accurate.

NOTE: The diagnostic lights will blink when the power button is amber or off, and will not blink when it is blue. This has no other significance.

Diagnostic Light Patterns

LED	
Power Button	
Problem Description	The computer is either turned off or is not receiving power.
Troubleshooting Steps	– Re-seat the power cable in the power connector at the back of the computer and the electrical outlet. – Bypass power strips, power extension cables, and other power protection devices to verify that the computer turns on properly.

- Ensure that any power strips being used are plugged into an electrical outlet and are turned on.
- Ensure that the electrical outlet is working by testing it with another device, such as a lamp.
- Ensure that the main power cable and front panel cable are securely connected to the system board.

LED	
Power Button	
Problem Description	A possible system board failure has occurred.
Troubleshooting Steps	Unplug the computer. Allow one minute for the power to drain. Plug the computer into a working electrical outlet and press the power button.
LED	
Power Button	
Problem Description	A possible system board, power supply, or peripheral failure has occurred.
Troubleshooting Steps	– Power off computer, leaving the computer plugged in. Press and hold the power supply test button at the rear of the power supply unit. If the LED next to the switch illuminates, the problem may be with your system board. – If the LED next to the switch does not illuminate, disconnect all internal and external peripherals, and press and hold the power supply test button. If it illuminates, there could be a problem with a peripheral. – If the LED still does not illuminate, remove the PSU connections from the system board, then press and hold the power supply button. If it illuminates, there could be a problem with the system board.

– If the LED still does not illuminate, the problem is with the power supply.

LED	
Power Button	
Problem Description	Memory modules are detected, but a memory power failure has occurred.
Troubleshooting Steps	– If two or more memory modules are installed, remove the modules, then re-install one module and re-start the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error. If only one memory module is installed, try moving it to a different DIMM connector and re-start the computer. – If available, install verified working memory of the same type into your computer.
LED	
Power Button	
Problem Description	BIOS may be corrupt or missing.
Troubleshooting Steps	The computer hardware is operating normally but the BIOS may be corrupt or missing.
LED	
Power Button	

Problem Description A possible system board failure has occurred.

Troubleshooting Steps Remove all peripheral cards from the PCI and PCI-E slots and re-start the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one.

LED

Power Button

Problem Description Power connector not installed properly.

Troubleshooting Steps Re-seat the 2x2 power connector from the power supply unit.

LED

Power Button

Problem Description Possible peripheral card or system board failure has occurred.

Troubleshooting Steps Remove all peripheral cards from the PCI and PCI-E slots and re-start the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one.

LED

Power Button

Problem Description A possible system board failure has occurred.

Troubleshooting Steps

- Disconnect all internal and external peripherals, and re-start the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one.

– If the problem persists, the system board is faulty.

LED

Power Button

Problem Description A possible coin cell battery failure has occurred.

Troubleshooting Steps Remove the coin cell battery for one minute, reinstall the battery, and restart.

LED

Power Button

Problem Description A possible processor failure has occurred.

Troubleshooting Steps Re-seat the processor.

LED

Power Button

Problem Description Memory modules are detected, but a memory failure has occurred.

Troubleshooting Steps

– If two or more memory modules are installed, remove the modules, then re-install one module and re-start the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error.

– If available, install working memory of the same type into your computer.

LED

Power Button

Problem Description A possible hard drive failure has occurred.

Troubleshooting Steps Re-seat all power and data cables.

LED

Power Button

Problem Description A possible USB failure has occurred.

Troubleshooting Steps Re-install all USB devices and check all cable connections.

LED

Power Button

Problem Description No memory modules are detected.

Troubleshooting Steps

– If two or more memory modules are installed, remove the modules, then reinstall one module and restart the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error.

– If available, install working memory of the same type into your computer.

LED

Power Button

Problem Description Memory modules are detected, but a memory configuration or compatibility error has occurred.

Troubleshooting Steps

- Ensure that no special requirements for memory module/connector placement exist.
- Ensure that the memory you are using is supported by your computer.

LED

Power Button

Problem Description A possible expansion card failure has occurred.

Troubleshooting Steps

- Determine if a conflict exists by removing an expansion card (not a graphics card) and restarting the computer.
- If the problem persists, reinstall the card you removed, then remove a different card and restart the computer.
- Repeat this process for each expansion card installed. If the computer starts normally, troubleshoot the last card removed from the computer for resource conflicts.

LED

Power Button

Problem Description A possible system board resource and/or hardware failure has occurred.

Troubleshooting Steps	– Clear CMOS. – Disconnect all internal and external peripherals, and restart the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one. – If the problem persists, the system board / system board component is faulty.
LED	
Power Button	
Problem Description	Some other failure has occurred.
Troubleshooting Steps	– Ensure that the display/monitor is plugged into a discrete graphic card. – Ensure that all hard drives and optical drive cables are properly connected to the system board. – If there is an error message on the screen identifying a problem with a device (hard drive), check the device to make sure it is functioning properly. – If the operating system is attempting to boot from a device (optical drive), check system setup to ensure the boot sequence is correct for the devices installed on your computer.

Beep Codes

The computer can emit a series of beeps during start-up if the display cannot show errors or problems. These series of beeps, called beep codes, identify various problems. The delay between each beep is 300 ms, the delay between each set of beeps is 3 sec, and the beep sound lasts 300 ms. After each beep and each set of beeps, the BIOS should detect if the user presses the power button. If so, BIOS will jump out from looping and execute the normal shutdown process and power system.

Code	1-1-2

Cause Microprocessor register failure

Code 1-1-3

Cause NVRAM

Code 1-1-4

Cause ROM BIOS checksum failure

Code 1-2-1

Cause Programmable interval timer

Code 1-2-2

Cause DMA initialization failure

Code 1-2-3

Cause DMA page register read/write failure

Code 1-3-1 through 2-4-4

Cause DIMMs not being properly identified or used

Code 3-1-1

Cause Slave DMA register failure

Code 3-1-2

Cause Master DMA register failure

Code 3-1-3

Cause Master interrupt mask register failure

Code 3-1-4

Cause Slave interrupt mask register failure

Code 3-2-2

Cause Interrupt vector loading failure

Code 3-2-4

Cause Keyboard Controller Test failure

Code 3-3-1

Cause NVRAM power loss

Code 3-3-2

Cause NVRAM configuration

Code 3-3-4

Cause Video Memory Test failure

Code 3-4-1

Cause Screen initialization failure

Code 3-4-2

Cause Screen retrace failure

Code 3-4-3

Cause Search for video ROM failure

Code 4–2–1

Cause No time tick

Code 4–2–2

Cause Shutdown failure

Code 4–2–3

Cause Gate A20 failure

Code 4–2–4

Cause Unexpected interrupt in protected mode

Code 4–3–1

Cause Memory failure above address 0FFFFh

Code 4–3–3

Cause Timer-chip counter 2 failure

Code 4–3–4

Cause Time-of-day clock stopped

Code 4–4–1

Cause Serial or parallel port test failure

Code 4–4–2

Cause Failure to decompress code to shadowed memory

Code 4–4–3

Cause Math coprocessor test failure

Code 4–4–4

Cause Cache test failure

Error Messages

Address mark not found

Description The BIOS found a faulty disk sector or could not find a particular disk sector.

Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please note this checkpoint and contact Dell Technical Support.

Description The computer failed to complete the boot routine three consecutive times for the same error. Contact Dell and report the checkpoint code (nnnn) to the support technician

Alert! Security override Jumper is installed.

Description The MFG_MODE jumper has been set and AMT Management features are disabled until it is removed.

Attachment failed to respond

Description The floppy or hard drive controller cannot send data to the associated drive.

Bad command or file name

Description Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct pathname.

Bad error-correction code (ECC) on disk read

Description The floppy or hard drive controller detected an uncorrectable read error.

Controller has failed

Description The hard drive or the associated controller is defective.

Data error

Description The floppy or hard drive cannot read the data. For the Windows operating system, run the chkdsk utility to check the file structure of the floppy or hard drive. For any other operating system, run the appropriate corresponding utility.

Decreasing available memory

Description One or more memory modules may be faulty or improperly seated. Re-install the memory modules and, if necessary, replace them.

Diskette drive 0 seek failure

Description A cable may be loose or the computer configuration information may not match the hardware configuration.

Diskette read failure

Description The floppy disk may be defective or a cable may be loose. If the drive access light turns on, try a different disk.

Diskette subsystem reset failed

Description The floppy drive controller may be faulty.

Gate A20 failure

Description One or more memory modules may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

General failure

Description The operating system is unable to carry out the command. This message is usually followed by specific information—for example, **Printer out of paper**. Take the appropriate action to resolve the problem.

Hard-disk drive configuration error

Description The hard drive failed initialization.

Hard-disk drive controller failure

Description The hard drive failed initialization.

Hard-disk drive failure

Description The hard drive failed initialization.

Hard-disk drive read failure

Description The hard drive failed initialization.

Invalid configuration information-please run SETUP program

Description The computer configuration information does not match the hardware configuration.

Invalid Memory configuration, please populate DIMM1

Description DIMM1 slot does not recognize a memory module. The module should be re-seated or installed.

Keyboard failure

Description A cable or connector may be loose, or the keyboard or keyboard/mouse controller may be faulty.

Memory address line failure at address, read value expecting value

Description A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory allocation error

Description The software you are attempting to run is conflicting with the operating system, another program, or a utility.

Memory data line failure at address, read value expecting value

Description A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory double word logic failure at address, read value expecting value

Description A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory odd/even logic failure at address, read value expecting value

Description A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them

Memory write/read failure at address, read value expecting value

Description A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory size in CMOS invalid

Description The amount of memory recorded in the computer configuration information does not match the memory installed in the computer.

Memory tests terminated by keystroke

Description A keystroke interrupted the memory test.

No boot device available

Description The computer cannot find the floppy disk or hard drive.

No boot sector on hard-disk drive

Description The computer configuration information in System Setup may be incorrect.

No timer tick interrupt

Description A chip on the system board might be malfunctioning.

Non-system disk or disk error

Description The floppy disk in drive A does not have a bootable operating system installed on it. Either replace the floppy disk with one that has a bootable operating system, or remove the floppy disk from drive A and restart the computer.

Not a boot diskette

Description The operating system is trying to boot to a floppy disk that does not have a bootable operating system installed on it. Insert a bootable floppy disk.

Plug and play configuration error

Description The computer encountered a problem while trying to configure one or more cards.

Read fault

Description The operating system cannot read from the floppy or hard drive, the computer could not find a particular sector on the disk, or the requested sector is defective.

Requested sector not found

Description The operating system cannot read from the floppy or hard drive, the computer could not find a particular sector on the disk, or the requested sector is defective.

Reset failed

Description The disk re-set operation failed.

Sector not found

Description The operating system cannot locate a sector on the floppy or hard drive.

Seek error

Description The operating system cannot find a specific track on the floppy disk or hard drive.

Shutdown failure

Description A chip on the system board might be malfunctioning.

Time-of-day clock stopped

Description The battery might be dead.

Time-of-day not set-please run the System Setup program

Description The time or date stored in System Setup does not match the computer clock.

Timer chip counter 2 failed

Description A chip on the system board may be malfunctioning.

Unexpected interrupt in protected mode

Description The keyboard controller may be malfunctioning or a memory module may be loose.

WARNING: Dell's Disk Monitoring System has detected that drive [0/1] on the [primary/secondary] EIDE controller is operating outside of normal specifications. It is advisable to immediately back up your data and replace your hard drive by calling your support desk or Dell.

Description During initial startup, the drive detected possible error conditions. When your computer finishes booting, immediately back up your data and replace your hard drive (for installation procedures, see "Adding and Removing Parts" for your computer type). If no replacement drive is immediately available and the drive is not the only bootable drive, enter System Setup and change the appropriate drive setting to **None**. Then remove the drive from the computer.

Write fault

Description The operating system cannot write to the floppy or hard drive.

Write fault on selected drive

Description The operating system cannot write to the floppy or hard drive.

X:\ is not accessible. The device is not ready

Description The floppy drive cannot read the disk. Insert a floppy disk into the drive and try again.

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Specifications

Technical Specifications

NOTE: Offerings may vary by region. For more information regarding the configuration of your computer, click Start (or Start in Windows XP) Help and Support, and then select the option to view information about your computer.

Processor	
Processor type	• Intel Core i3 series • Intel Core i5 series • Intel Core i7 series • Intel Pentium series • Intel Celeron series
Total Cache	Up to 8 MB cache depending on processor type

Memory	
Type	DDR3
Speed	1333 MHz
Connectors	
Desktop, Mini-Tower, Small Form Factor	four DIMM slots
Ultra Small Form Factor	two DIMM slots
Capacity	1 GB, 2 GB, and 4 GB
Minimum Memory	1 GB
Maximum memory	

Memory

Desktop, Mini-Tower, Small Form Factor	16 GB
Ultra Small Form Factor	8 GB

Video

Integrated	• Intel HD Graphics (with Intel Celeron/Pentium-class CPU-GPU combo) • Intel HD Graphics 2000 (with Intel Core i3 DC 65 W and Intel Core i5/i7 QC vPRO 95 W-class CPU-GPU combo)
Discrete	PCI Express x16 graphics adapter

Audio

Integrated	four Channel High Definition Audio

Network

Integrated	Intel 82579LM Ethernet capable of 10/100/1000 Mb/s communication

System Information

System Chipset	Intel 6 Series Express Chipset
DMA Channels	two 82C37 DMA controllers with seven independently programmable channels
Interrupt Levels	Integrated I/O APIC capability with 24 interrupts
BIOS Chip (NVRAM)	80 MB (10 MB)

Expansion Bus

Bus Type	PCI 2.3, PCI Express 2.0, SATA 3.0 and 2.0, USB 2.0
Bus Speed:	PCI Express:

Expansion Bus

	• x1-slot bidirectional speed – 500 MB/s • x16-slot bidirectional speed – 16 GB/s
	SATA: 1.5 Gbps, 3.0 Gbps, and 6 Gbps

Cards

PCI		
	Mini-Tower	up to one full-height card
	Desktop	up to one low-profile card
	Small Form Factor	none
	Ultra Small Form Factor	none
PCI Express x1		
	Mini-Tower	up to three full-height cards
	Desktop	up to three low-profile cards
	Small Form Factor	up to two low-profile cards
	Ultra Small Form Factor	none
PCI-Express x16		
	Mini-Tower	up to two full-height cards
	Desktop	up to two low-profile cards
	Small Form Factor	up to two low-profile cards
	Ultra Small Form Factor	none
Mini PCI Express		
	Mini-Tower	none
	Desktop	none
	Small Form Factor	none
	Ultra Small Form Factor	up to one half-height card

Drives

Externally Accessible (5.25–inch drive bays)		
	Mini-Tower	two
	Desktop	one
	Small Form Factor	one slim optical drive bay
	Ultra Small Form Factor	one slim optical drive bay
Internally Accessible:		
3.5–inch SATA drive bays		
	Mini-Tower	two
	Desktop	one
	Small Form Factor	one
	Ultra Small Form Factor	none
2.5–inch SATA drive bays		
	Mini-Tower	two
	Desktop	one
	Small Form Factor	one
	Ultra Small Form Factor	one

External Connectors

Audio:	
Back Panel	two connectors for line-out and line-in/ microphone
Front Panel	two connectors for microphone and headphone
Network Adapter	one RJ45 connector
Serial	one 9-pin connector; 16550C compatible
Parallel	one 25-pin connector (optional for mini-tower)
USB 2.0	

External Connectors

	Mini-Tower, Desktop, Small Form Factor	Front Panel: 4
		Back Panel: 6
	Ultra Small Form Factor	Front Panel: 2
		Back Panel: 5
Video		15-pin VGA connector, 20-pin DisplayPort connector
		NOTE: Available video connectors may vary based on the graphics card selected.

System Board Connectors

PCI 2.3 data width (maximum) — 32 bits		
	Mini-Tower, Desktop	one 120-pin connector
	Small Form Factor, Ultra Small Form Factor	none
PCI Express x1 data width (maximum) — one PCI Express lane		
	Mini-Tower, Desktop	one 36-pin connector
	Small Form Factor, Ultra Small Form Factor	none
PCI Express x16 (wired as x4) data width (maximum) — four PCI Express lanes		
	Mini-Tower, Desktop, Small Form Factor	one 164-pin connector
	Ultra Small Form Factor	none
PCI Express x16 data width (maximum) — 16 PCI Express lanes		
	Mini-Tower, Desktop, Small Form Factor	one 164-pin connector
	Ultra Small Form Factor	none

Mini PCI Express data width (maximum) — one PCI Express lane and one USB interface		
	Mini-Tower, Desktop, Small Form Factor	none
	Ultra Small Form Factor	one 52-pin connector
Serial ATA		
	Mini-Tower	four 7-pin connectors
	Desktop	three 7-pin connectors
	Small Form Factor	three 7-pin connectors
	Ultra Small Form Factor	two 7-pin connectors
Memory		
	Mini-Tower, Desktop, Small Form Factor	four 240-pin connectors
	Ultra Small Form Factor	two 240-pin connectors
Internal USB		
	Mini-Tower, Desktop	one 10-pin connector
	Small Form Factor, Ultra Small Form Factor	none
System Fan		one 5-pin connector
Front panel control		
	Mini-Tower, Desktop, Small Form Factor	one 34-pin and one 5-pin connector
	Ultra Small Form Factor	one 20-pin and one 14-pin connector
Thermal Sensor	Mini-Tower	one 2-pin connector
	Desktop, Small Form Factor, Ultra Small Form Factor	two 2-pin connectors

System Board Connectors

Processor	one 1155-pin connector
Processor Fan	one 5-pin connector
Service mode jumper	one 2-pin connector
Password clear jumper	one 2-pin connector
RTC reset jumper	one 2-pin connector
Internal speaker	one 5-pin connector
Intruder connector	one 3-pin connector
Power connector	
Mini-Tower, Desktop, Small Form Factor	one 24-pin and one 4-pin connector
Ultra Small Form Factor	one 8-pin, one 6-pin, and one 4-pin connector

Controls and Lights

Front of the computer:

Power button light	Blue light — Solid blue light indicates power-on state; blinking blue light indicates sleep state of the computer. Amber light — Solid amber light when the computer does not start indicates a problem with the system board or power supply. Blinking amber light indicates a problem with the system board.
Drive activity light	Blue light — Blinking blue light indicates that the computer is reading data from or writing data to the hard drive.
Diagnostic lights	Four lights located on the front panel of the computer. For more information on the diagnostic lights,

	see the Service Manual at support.dell.com/manuals.
Back of the computer:	
Link integrity light on integrated network adapter	Green — a good 10 Mbps connection exists between the network and the computer. Orange — a good 100 Mbps connection exists between the network and the computer. Yellow — a good 1000 Mbps connection exists between the network and the computer. Off (no light) — the computer is not detecting a physical connection to the network.
Network activity light on integrated network adapter	Yellow light — A blinking yellow light indicates that network activity is present.
Power supply diagnostic light	Green light — The power supply is turned on and is functional. The power cable must be connected to the power connector (at the back of the computer) and the electrical outlet. **NOTE:** You can test the health of the power system by pressing the test button. When the system power supply voltage is within specification, the self-test LED lights up. If the LED does not light up, the power supply may be defective. AC power must be connected during this test.

Power	Wattage	Maximum Heat Dissipation	Voltage
Mini-Tower	265 W	1390 BTU/hr	100 VAC to 240 VAC, 50 Hz to 60 Hz, 5.0 A
Desktop	250 W	1312 BTU/hr	100 VAC to 240 VAC, 50 Hz to 60 Hz, 4.4 A
Small Form Factor	240 W	1259 BTU/hr	100 VAC to 240 VAC, 50 Hz to 60 Hz, 3.6 A; 100 VAC to 240 VAC, 50 Hz to 60 Hz, 4.0 A
Ultra Small Form Factor	200 W	758 BTU/hr	100 VAC to 240 VAC, 50 Hz to 60 Hz, 2.9 A
Coin-cell battery	3 V CR2032 lithium coin cell		

NOTE: Heat dissipation is calculated by using the power supply wattage rating.

Physical	Height	Width	Depth	Weight
Mini-Tower	36.00 cm (14.17 inches)	17.50 cm (6.89 inches)	41.70 cm (16.42 inches)	8.87 kg (19.55 lb)
Desktop	36.00 cm (14.17 inches)	10.20 cm (4.01 inches)	41.00 cm (16.14 inches)	7.56 kg (16.67 lb)
Small Form Factor	29.00 cm (11.42 inches)	9.26 cm (3.65 inches)	31.20 cm (12.28 inches)	5.70 kg (12.57 lb)
Ultra Small Form Factor	23.70 cm (9.33 inches)	6.50 cm (2.56 inches)	24.00 cm (9.45 inches)	3.27 kg (7.20 lb)

Environmental		
Temperature range:		
	Operating	10 °C to 35 °C (50 °F to 95 °F)
	Storage	–40 °C to 65 °C (–40 °F to 149 °F)
Relative humidity (maximum):		
	Operating	20% to 80% (non-condensing)
	Storage	5% to 95% (non-condensing)
Maximum vibration:		
	Operating	0.26 GRMS

Environmental		
	Storage	2.2 GRMS
Maximum shock:		
	Operating	40 G
	Storage	105 G
Altitude:		
	Operating	–15.2 m to 3048 m (–50 ft to 10,000 ft)
	Storage	–15.2 m to 10,668 m (–50 ft to 35,000 ft)
Airborne contaminant level		G1 or lower as defined by ANSI/ISA-S71.04-1985

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Contacting Dell

Contacting Dell

NOTE: If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Visit **support.dell.com**.
2. Select your support category.
3. If you are not a U.S. customer, select your country code at the bottom of the page, or select **All** to see more choices.
4. Select the appropriate service or support link based on your need.